REPORT DOCUMENTATION PAGE

Form Approved OMB No. 0704-0188

1. REPORT DATE *(DD-MM-YYYY)*	2. REPORT TYPE	3. DATES COVERED *(From - To)*
	Technical Papers	

4. TITLE AND SUBTITLE

5a. CONTRACT NUMBER

5b. GRANT NUMBER

5c. PROGRAM ELEMENT NUMBER

6. AUTHOR(S)

5d. PROJECT NUMBER
2303

5e. TASK NUMBER
M2C8

5f. WORK UNIT NUMBER

7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES)

Air Force Research Laboratory (AFMC)
AFRL/PRS
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8. PERFORMING ORGANIZATION REPORT

9. SPONSORING / MONITORING AGENCY NAME(S) AND ADDRESS(ES)

Air Force Research Laboratory (AFMC)
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5 Pollux Drive
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10. SPONSOR/MONITOR'S ACRONYM(S)

11. SPONSOR/MONITOR'S NUMBER(S)

12. DISTRIBUTION / AVAILABILITY STATEMENT

Approved for public release; distribution unlimited.

13. SUPPLEMENTARY NOTES

14. ABSTRACT

1121 009

15. SUBJECT TERMS

16. SECURITY CLASSIFICATION OF:			17. LIMITATION OF ABSTRACT	18. NUMBER OF PAGES	19a. NAME OF RESPONSIBLE PERSON
a. REPORT	b. ABSTRACT	c. THIS PAGE			Leilani Richardson
Unclassified	Unclassified	Unclassified	A		19b. TELEPHONE NUMBER *(include area code)* (661) 275-5015

62 separate items are enclosed

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MEMORANDUM FOR PRS (Contractor/In-House Publication)

FROM: PROI (TI) (STINFO) 20 September 2000

SUBJECT: Authorization for Release of Technical Information, Control Number: **AFRL-PR-ED-AB-2000-179**
Drake, Greg; Tollison, Kerri (ERC), et al., "The Synthesis and Characterization of New Energetic Salts"

HEDM Conference (Park City, UT, 24-26 Oct 2000) **(Statement A)**
(Deadline: 25 Sep 2000)

1. This request has been reviewed by the Foreign Disclosure Office for: a.) appropriateness of distribution statement, b.) military/national critical technology, c.) export controls or distribution restrictions, d.) appropriateness for release to a foreign nation, and e.) technical sensitivity and/or economic sensitivity.
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APPROVED/APPROVED AS AMENDED/DISAPPROVED

_____

PHILIP A. KESSEL Date
Technical Advisor
Propulsion Science and Advanced Concepts Division

The Synthesis and Characterization of New Energetic Salts

Greg Drake; Kerri Tollison*; Tom Hawkins; Adam Brand; Milton McKay; Ismail Ismail*

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As growing concerns arise over the use of hydrazine in monopropellant systems, alternatives to replace it are being sought by several investigators in the field. At AFRL, we have been pursuing the use of energetic salts as viable monopropellant ingredients. They have several inherent advantages over hydrazine, ~~which include~~ including essentially no vapor pressure, which results in low vapor toxicities, significantly higher densities, and overall, significantly higher performing materials. Recently, we have been investigating several salt systems based on amino substituted triazole systems. Most of the heterocycle systems which were investigated are either commercially available or are synthesized in simple, high-yield operations. The triazole systems investigated include 1H-1, 2, 4-triazole, 4-amino-1, 2, 4-triazole, 3, 4, 5-triamino-1, 2, 4-triazole, 3-hydrazino-4-amino-1, 2, 4-triazole, and 1H-1, 2, 3-triazole. The nitrate, perchlorate, and dinitramide salts were synthesized and characterized by vibrational and multinuclear nmr spectroscopy, and elemental analyses. Other materials will also be discussed including the synthesis and characterization of energetic salts of ethylene bisoxyamine, NH_2-O-CH_2-CH_2-O-NH_2, and 1, 3-diamino-2-propanol, NH_2-CH_2-CH(OH)-CH_2-NH_2. Both of these systems were used to make a large family of energetic salts. In all cases, the thermal stability and safety properties including impact and friction testing were carried out on these new salts and the results will be presented.